

INTRAOCULAR LENS WITH FLEXIBLE C-SHAPED SUPPORTS

This invention relates to intraocular lenses and, more particularly, to intraocular lenses of the type suitable for use in the posterior chamber of the human eye after the removal of a natural lens as the result of a cataract condition.

Preparatory to removal of a cataract, the surgeon makes an opening in the anterior capsule so as to expose a portion of the natural lens. The opening is typically generally triangular in shape with substantially more of the anterior capsule remaining in the lower or inferior portion of the capsule than remains in the upper or superior portion. When seating a posterior chamber lens in the cul-de-sac formed between the anterior capsule and the posterior capsule, it is easier to seat the lens in the lower portion of the capsule where more anterior capsule tissue is present than it is to seat the lens in the upper portion where no, or only little, anterior tissue remains. It is also easier subsequently to remove the lens from the lower portion of the capsule by sliding the lens out towards the incision in the cornea of the eye than it is to remove the lens from the upper portion of the capsule since the lens has to be rocked back and forth to remove it from the upper portion of the capsule, and in so doing, the lens may tear the capsule.

Prior posterior chamber lenses, particularly since they are designed to seat in the lower, as well as in the upper portions of the capsule, have been subjected to the above-mentioned limitations. One such posterior chamber lens is disclosed and claimed in my U.S. Pat. No. 4,343,050 and is represented in FIGS. 3-6 thereof. The lens specifically disclosed in my U.S. Pat. No. 4,343,050 has two position fixation members which are generally "C"-shaped when seated in the capsule of the eye and which have notched regions, and an additional position fixation stabilizing member is also provided primarily to maintain the lens in the proper position with respect to the vertical plane of the lens body but is seated in the upper portion of the capsule.

While this lens is satisfactory, there is a need for a lens which can be easily implanted in the posterior chamber of the eye and which can be easily removed by a surgeon without substantial damage to the eye during implantation and which will facilitate removal of the lens at a later date should such removal be indicated.

In accordance with the invention, an intraocular lens with flexible support suitable for use as an artificial lens in the interior of a human eye, the eye interior having first and second groove portions extending peripherally at lower and upper portions of the eye when viewed in cross-section and having an iris disposed anteriorly of the groove portions, comprises a light-focusing lens body and position fixation means extending from the lens body and comprising first and second support portions extending generally around substantially the entire periphery of the lens body. Each of the first and second portions are generally C-shaped with the respective inner concave edges of the support portions facing each other and the outer, generally convex, edge of each of the support portions comprising at least one protruding contact point for seating each of the respective support portions in the first groove portion of the eye. The first and second support portions are resiliently deformable, in response to a force applied thereto prior to seating of the lens in the eye, and are capable of spontaneously

returning toward substantially their undeformed condition upon removal of the applied force for seating the lens in the eye. The lens also comprises a stabilizing portion extending in a direction outwardly of the lens body toward the second groove portion of the eye without being seated therein.

It is an object of the present invention, therefore, to provide a new and improved intraocular lens which avoids one or more of the above-mentioned limitations and disadvantages of prior such lenses.

It is another object of the invention to provide a new and improved posterior chamber intraocular lens which avoids one or more of the above-mentioned limitations and disadvantages of prior such lenses.

It is another object of the invention to provide a new and improved posterior chamber intraocular lens which can be easily fixed in position in the eye.

It is another object of the invention to provide a new and improved posterior chamber intraocular lens which is easily removable from the eye.

It is another object of the invention to provide a new and improved posterior chamber intraocular lens which is easily removable from the superior portion of the eye.

For a better understanding of the present invention, together with other and further objects thereof, reference is made to the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

FIG. 1 is a plan view of an embodiment of the present invention in an undeformed condition;

FIG. 2 is a plan view of the intraocular lens structure of FIG. 1 as deformed for insertion and position fixation within an eye;

FIG. 3 is a partly diagrammatic view, in section, of an eye with the FIG. 1 intraocular lens positioned therein;

FIG. 4 is a fragmentary, diagrammatic plan view of an eye having the FIG. 1 lens positioned therein and corresponding to the sectional view of FIG. 3; and

FIG. 5 is a plan view of an intraocular lens in accordance with another embodiment of the present invention.

Referring now more particularly to FIGS. 1, 3 and 4 of the drawings, an intraocular lens 10 with flexible support suitable for use as an artificial lens in the interior of a human eye is represented in undeformed condition in FIG. 1. The interior of the eye, represented diagrammatically in section in FIG. 3 and in fragmentary, plan view in FIG. 4, has first and second groove portions 11, 12 at lower and upper portions 14, 13 of the eye when viewed in cross-section and has an iris 15 disposed anteriorly of the groove portions 11, 12. As best seen in FIG. 4, the anterior capsule 27 has a generally triangular opening leaving portions 27a and 27b thereof forming pockets with the posterior capsule in the lower portion of the capsule, said pockets extending substantially along said first groove portion and beyond the equator 26.

The lens 10 comprises a light-focusing lens body 16 and includes position fixation means 17 extending from the lens body 16 and comprising first and second support portions 18, 19 extending generally peripherally of the lens body 16. The lens body 16 may be constructed of any biologically inert and transparent material suitable for optical correction such as polymethylmethacrylate, quartz, ophthalmic glass, and other materials known in the art. Each of the first and second support portions 18, 19 is generally "C" shaped with the respective inner concave edges 20, 21 of the support portions